

The position of the catheters relative to the tumour bed was measured in CT.

**Results:** With sole US guidance, seven out of 10 catheters passed through the tumour bed. The catheter spacing was inconsistent and the desired goal of two rows of five equally-spaced catheters was not precisely achieved, with a mean spacing of 1.0 cm with 0.7 - 1.9 cm range. Under combined EMT-US guidance, nine out of 10 catheters passed through the tumour bed, yielding two rows of five catheters with more consistent spacing, with a mean spacing of 1.0 cm with 0.8-1.2 cm range.

**Conclusions:** This phantom experiment suggests that combined EMT-US guidance can help achieve consistent catheter spacing over the tumour bed. These results are preliminary, and a trial of the method is now being conducted to validate our results. Additional research is being conducted to translate the proposed navigation technique to patient trials.

202

BRACHYTHERAPY FOR ENDOBRONCHIAL METASTASIS: AN EFFECTIVE METHOD OF ACHIEVING PALLIATIVE RELIEF OF COUGH, HEMOPTYSIS, CHEST PAIN AND DYSPNEA

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**Purpose:** Endobronchial metastasis originating from primary cancers outside the lung are rare in comparison with parenchymal metastasis. External beam radiotherapy (EBRT) is often attempted for control of cough, hemoptysis, chest pain and dyspnea with variable effectiveness and potential toxicities. There are also limitations to re-treatment with EBRT if symptoms recur. Documented experience in the use of brachytherapy for these patients is very limited in the literature. We report a cohort of patients with endobronchial metastasis treated with high-dose rate (HDR) brachytherapy at our center. **Methods and Materials:** A prospective database was created from 2006-2015 including demographic, treatment and outcome data. Patients with endobronchial metastasis from any primary site outside the lung who received one or more high-dose rate brachytherapy treatments with iridium-192 were included. Cough, dyspnea, chest pain and hemoptysis were assessed and graded by the primary medical team as absent (0), mild (1), moderate (2), significant (3), and severe (4) at the time of initial consult and in follow up. The duration of symptom improvement and re-expansion of the lung documented on imaging were analyzed using Kaplan-Meier curves.

**Results:** Thirty-five patients with endobronchial metastasis were identified (14 GIT, five breast, three each of sarcoma, lymphoma, melanoma, renal cell, two head and neck, one cervix and one testicle). The majority of patients received three fractions of 700 cGy, and 15 patients had received EBRT to the lung beforehand and four afterwards. Median symptom-free survival was 67 days and overall survival was 117 days. Of patients reporting the presence of symptoms at baseline, improvement in cough was documented in 75.0 % (21/28), hemoptysis in 76.4% (13/18), pain in 64.3% (9/14) and dyspnea in 60.0% (18/30) for a median of three, three, three and six months respectively. Absent to mild cough (n = 8), hemoptysis (n = 17), pain (n = 21), and dyspnea (n = 6) scores were maintained for median periods of two, three and four months respectively. Of the 22 patients who had subsequent chest imaging, re-expansion was documented in 32%. There were no significant toxicities reported.

**Conclusions:** Brachytherapy appears effective in achieving durable symptom control of cough hemoptysis and dyspnea in patients with metastatic disease located in the bronchus. It can be used in combination with or as an alternative to external beam radiotherapy, and should be considered routinely where available in this patient population. Further studies are required to better characterize expected symptom improvement and lung re-expansion rates.

203

HIGH-DOSE RATE BRACHYTHERAPY FOR THE MANAGEMENT OF MALIGNANT ENDOBRONCHIAL OBSTRUCTION AND HEMOPTYSIS: INSTITUTIONAL CASE SERIES OF 28 PATIENTS

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**Purpose:** Endobronchial complications of primary and metastatic lung malignancy contribute to considerable patient morbidity and adversely affect quality-of-life with symptoms of dyspnea and hemoptysis. Endobronchial High-Dose Rate (HDR) Brachytherapy is an efficacious treatment strategy indicated for large obstructing endobronchial lesions not amenable for surgical resection, combination treatment with external beam radiotherapy for potentially improved local control and for the palliation of symptoms in the re-treatment setting. The purpose of this study was to explore the clinical features and outcomes in a consecutive series of patients treated for malignant endobronchial obstruction at a single institution.

**Methods and Materials:** A retrospective analysis was performed on all consecutive patients treated at the Cancer Centre of Southeastern Ontario with endobronchial HDR Brachytherapy between November 2012 and March 2015. The demographic and clinical characteristics were collected and overall survival and symptomatic progression-free survival are reported.

**Results:** Twenty-eight consecutively treated patients (17 male and 11 female) were identified for review. The average age at the time of treatment was 69.12 years. The majority of patients had a histopathological diagnosis of lung cancer (n = 21 non-small cell lung cancer, n = 1 small cell lung cancer) while the remainder (n = 6) had metastatic disease from other primaries. Fifteen patients had metastatic disease at presentation and nine were treated with systemic therapy prior to brachytherapy. The major indication for treatment included dyspnea (n = 18) and hemoptysis (n = 10) with 12 patients identified to have complete bronchial occlusion by bronchoscopy. Two patients were treated in a critical care setting and discharged home with stabilization of symptoms. The median overall survival for the group was 17.58 weeks while the median symptomatic progression-free survival was 9.82 weeks.

**Conclusions:** Endobronchial HDR brachytherapy remains an efficacious treatment strategy for patients presenting with malignant bronchial occlusion causing dyspnea and/or hemoptysis. Our experience demonstrates that carefully-selected patients can experience effective palliation of symptoms despite an overall poor prognosis for the group. While limited, our experience also demonstrates that some patients with massive-hemoptysis or respiratory failure may benefit from treatment in the hands of a skilled brachytherapy team.

204

DO RECTAL TUBES IMPROVE DOSIMETRY IN INTERSTITIAL BRACHYTHERAPY FOR GYNECOLOGICAL MALIGNANCIES?

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**Purpose:** The dosimetry of trans-perineal interstitial brachytherapy (ISBT) treatment of gynecological malignancies can be significantly affected by the presence of rectal gas. This study evaluates the impact of using a rectal tube on dosimetric factors.

**Methods and Materials:** Twenty-nine patients treated between August and December 2015 at our institution were included in a prospective registry trial. Data on the use of a rectal tube and dosimetric parameters were collected. Rectal volume, maximum dose to 2 cc of the rectum contour (D2cc) and the minimum dose to 90% of the high-risk clinical target volume (HR-CTV D90) was compared using a t-test for the rectal tube and no rectal tube cohorts. The rectal volume was measured from 1cm above and